instrument, he reports that he could see in the starch grains concentric or excentric rows of particles, for which he uses NÄGELI'S term micellae. These are separated by spaces which are optically empty or possibly contain amicroscopic matter. On swelling, the micellae separate more and more and lose their regular arrangement. Cell membranes show an essentially similar structure, cellulose walls showing very small pale particles, woody and corky walls, on the contrary, having brilliant and large micellae.

Living cytoplasm is a hydrosol complex. The micellae show active Brownian movements, oscillation, wiggling, collision, recession, etc., even when actively streaming. The better nourished the cytoplasm is, the more numerous and closer are the micellae and the less the amplitude of the movements; and *vice versa*. By a thin hydrogel layer, a coagulum formed by the electrolytes present in the water of the cell wall and vacuole, this hydrosol is protected against further injury by coagulation or against excessive solution by water. The healing of this hydrogel layer or ectoplast after taking in or extruding solid particles (as in Amoeba) is explained as due to coagulation of the micellae of the hydrosol at the spot exposed by the break to the action of electrolytes. At the death of the protoplast there arises a hydrogel complex. The nucleus consists of a hydrosol complex poor in water. The chromatophores resemble rather the hydrogel complex. Microsomes consist of several micellae and are comparable to the *Micellarverbänden* of NÄGELI.

So far as these preliminary accounts show, GAIDUKOV is not merely reporting what he sees, but is making many assumptions as to their interpretation.—C. R. B.

Germination of fern and moss spores.—LAAGE[16] has made a somewhat extended study of the germination of fern and moss spores in darkness. By using both organic and inorganic solutions as culture media he was able to germinate *Osmunda regalis* and thirteen out of sixteen species of Polypodiaceae in darkness. Germination and starch formation were obtained in Osmunda grown in distilled water without the influence of light. Fe_2Cl_6 and $FeSO_4$ stimulated germination and cell division in Osmunda in darkness. Of all the Polypodiaceae, sown in darkness, *Pteris aquilina* and *Scolopendrium officinarum* germinated best, and *Asplenium lucidulum* and *Polypodium aureum* not at all. Contrary to the results of HEALD, higher temperatures were found to be detrimental to germination in the absence of light. No chlorophyll was produced in darkness, although reported by SCHILLING. The osmotic effect of the solutions on germinating spores was marked. Abnormal forms of rhizoids developed in distilled water cultures, and in 4 per cent. Knop's solution they were suppressed, while the young prothallia were deformed. A number of instructive tables showing the effect of solutions of different strengths on germination and number of cells produced in darkness are given. Of the mosses, Funaria and Bryum were germinated in darkness by using very attenuated solutions of inorganic

[16] LAAGE, A., Bedingungen der Keimung von Farn- und Moossporen. Beih. Bot. Centralbl. **21**:77–115. 1907.

salts as culture media. *Polytrichum commune* could neither be germinated in darkness in the solutions of inorganic salts nor by the addition of organic iron salts to the fluids. Moss spores have been germinated in darkness under chemical stimuli by both HEALD and TRÉBOUX. LAAGE is the first to report germination of fern spores by means of chemical stimuli.—W. J. G. LAND.

Artificial apospory in ferns.—GOEBEL[17] has published the result of his studies on apospory in ferns and on regeneration in Vicia and Phaseolus. The main part of his paper is devoted to apospory and a very brief account is given of regeneration in Vicia.

Contrary to BOWER'S statement that attempts to induce apospory, though successful in certain mosses, have been entirely without results in ferns, GOEBEL succeeded in inducing artificially aposporous prothallia from primary leaves of sporophytes in many forms among ferns, such as *Aneimia Drageana*, *Alsophila van Geertii*, *Ceratopteris thalictroides*, *Gymnogramme chrysophylla*, *Polypodium aureum*, *Pteris longifolia*, and others. On certain parts of the under surface, of margin or of petiole of the primary leaf, there are produced prothallia, sporophytes, or even structures which really seem to be intermediate between sporophyte and prothallium by their having stomata and antheridia.

GOEBEL drew three conclusions from his studies: (1) regeneration is more active in a young leaf than an older one; (2) the sporophytic structure is not the constant product of regeneration; (3) there seems to exist no great difference between the nuclei of prothallia and those of sporophytes, and accordingly no sharp distinction between the *x* and *2x* generations. He adds, one might regard the prothallium, phylogenetically, as a rudimentary leaf bearing sexual organs, though to determine this question further investigation is necessary.

Among the three conclusions drawn by GOEBEL, the third is a great problem. He does not enter in his paper into nuclear detail at all; therefore, cytologically it is still an open question.—SHIGÉO YAMANOUCHI.

Items of taxonomic interest.—W. H. BLANCHARD (Torreya **7**:97–102. 1907), in discussing the eastern species of Amelanchier, describes 2 new species.—N. L. BRITTON (*idem* 102) has described a new Mexican species of Ribes.—H. D. HOUSE (*idem* 133–136), in a second paper on southern violets, has described a new species and a new hybrid.—W. H. BLANCHARD (*idem* 139, 140) has described a new Rubus (red raspberry) from Vermont.—E. BRAINERD (Rhodora **9**:93–98. 1907) has begun a presentation of the older types of North American violets.—L. M. UNDERWOOD (Bull. Torr. Bot. Club **34**:243–262. 1907), in continuation of his studies on "American ferns," has published a preliminary review of the N. Am. Gleicheniaceae, all the species being referred to Dicranopteris, in which 18 species are recognized, 5 being described as new, and all the rest being transferred. —C. L. SHEAR (Bull. Torr. Bot. Club **34**:305–317. 1907) has described 21 new

[17] GOEBEL, K., Experimentell-morphologische Mitteilungen: 1. Künstlich hervorgerufene Aposporie bei Farnen. 2. Ueber die Bedingungen der Wurzelregeneration bei einigen Pflanzen. Sitz. Kön. Bayer. Akad. Wiss. **37**:119–138. *figs. 13.* 1907.